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10/046,797	01/14/2002	Huitao Luo	10014091-1	6419

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EXAMINER	
RICHER, AARON M	

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2628	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/046,797	LUO, HUITAO	
	Examiner	Art Unit	
	Aaron M. Richer	2628	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *29 June 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,2,4,5,7-14 and 16-36* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *12-14,16-19,29,30,35 and 36* is/are allowed.

6)☒ Claim(s) *1,2,4,5,7-11,20-28 and 31-34* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments filed June 29, 2007 have been fully considered but they are not persuasive. It is noted, for clarity, that claim 20 differs from claim 12 and claim 1, in that claims 1 and 12 recite a predetermined function which calculates gradients over respective spatial areas of an image *limited* by a scale parameter. While the invention of Makram-Ebeid is silent regarding *limiting* the area a gradient is calculated in, the invention does disclose a scale parameter that defines a region, rendering claim 20 obvious.

2. With respect to claims 1, 2, 4, 5, 7-11, and 25-28, the amendment filed overcomes the previous 35 USC 103 rejections. However, upon further consideration, new grounds of rejection are made under 35 USC 101.

3. With respect to claims 33 and 34, the amendment filed overcomes the previous 35 USC 103 rejections. However, upon further consideration, new grounds of rejection are made under 35 USC 112.

Claim Rejections - 35 USC § 101

4. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

5. Claims 1, 2, 4, 5, 7-11, and 25-28 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

6. Claim 1 recites a "system" comprising "code" for implementing various functions. From applicant's specification, see fig. 10 especially, it appears that this system is actually a computer program, per se, which is non-statutory. This is in contrast with a statutory "computer-readable medium" which defines interrelationships between the program and the computer. See MPEP 2106.01, which recites:

> Data structures not claimed as embodied in computer-readable media are descriptive material per se and are not statutory because they are not capable of causing functional change in the computer. See, e.g., Warmerdam, 33 F.3d at 1361, 31 USPQ2d at 1760 (claim to a data structure per se held nonstatutory). Such claimed data structures do not define any structural and functional interrelationships between the data structure and other claimed aspects of the invention which permit the data structure's functionality to be realized. In contrast, a claimed computer-readable medium encoded with a data structure defines structural and functional interrelationships between the data structure and the computer software and hardware components which permit the data structure's functionality to be realized, and is thus statutory.
>
> Similarly, computer programs claimed as computer listings per se, i.e., the descriptions or expressions of the programs, are not physical "things." They are neither computer components nor statutory processes, as they are not "acts" being performed. Such claimed computer programs do not define any structural and functional interrelationships between the computer program and other claimed elements of a computer which permit the computer program's functionality to be realized. In contrast, a claimed computer-readable medium encoded with a computer program is a computer element which defines structural and functional interrelationships between the computer program and the rest of the computer which permit the computer program's functionality to be realized, and is thus statutory. See Lowry, 32 F.3d at 1583-84, 32 USPQ2d at 1035. Accordingly, it is important to distinguish claims that define descriptive material per se from claims that define statutory inventions.

Claim Rejections - 35 USC § 112

7. Claims 33 and 34 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

8. Claim 33 recites a "computer" comprising "circuitry" which "includes" a "predetermined function" to calculate gradients. The "computer" recited in the preamble makes it clear that this claim falls under the statutory category of a physical machine. However, the "predetermined function" is not a physical part of the machine, but rather a

process performed by the machine, and so it is not clear how such a process can be *included* in circuitry. The circuitry could certainly *implement* the process, but that does not mean that the function itself is circuitry. The use of the word "includes" makes it unclear if the "function" is a piece of circuitry or simply a process *executed* by the circuitry.

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

10. Claims 20-23 and 31-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Catros (U.S. Patent 4,843,630) in view of Makram-Ebeid (U.S. Patent 6,332,034).

11. Claim 20 recites "A method for processing boundary information associated with an object in a graphical image, said method comprising: identifying two vertices in said graphical image". Catros discloses "a method of bridging between disjointed contour elements in an image by searching for an optimum bridging path between the facing ends of the disjointed contour elements" (col. 1, lines 40-54). These points on disjointed contour elements read on vertices, because they are points on contours to be joined by "bridging".

Claim 20 further recites "detecting a plurality of contours between said two vertices by determining a respective shortest path between said two vertices, said

respective shortest path being weighted by gradient calculations of said graphical image over regions defined at least by a pixel neighborhood and a scale parameter, and each contour of said plurality of contours being associated with a respective scale parameter of a plurality of scale parameters". Catros discloses a method of determining a shortest path between vertices by gradient weighting, as described in the rejections to claims 3 and 4. Catros does not disclose regions defined by a scale parameter, nor does Catros disclose contours being associated with a scale parameter.

Makram-Ebeid, however, discloses "The merging of two adjacent regions is possible only in the case in which the Energy function is minimized. This Energy function comprises two terms: a first term which takes into account the intensity variance in each region of the image and a second term which takes into account the total length of the boundaries in the image, weighted by a so-called scale parameter .lambda.. The execution of the algorithm consists first of all in assigning the value 1 to the scale factor .lambda. and in merging two adjacent regions, if any, which minimize the Energy function. The resultant regions are then re-organized by elimination of the interface of the two merged regions, the terms of the Energy function are calculated again and a new attempt for a merger is made, utilizing the scale factor .lambda.=1. This operation is repeated until there is no longer any region having an adjacent region for a merger when the scale factor .lambda.=1. After each merger the resultant regions are re-organized by elimination of the interfaces. Subsequently, the same operations are performed with the scale parameter .lambda.=2, etc., until the Energy function cannot be further minimized" (col. 1, lines 45-66).

Here, Makram-Ebeid is disclosing a method of merging regions, in which each region and contour is created at, and therefore associated with a certain scale parameter. The regions are also defined by a pixel neighborhood, as the images in figs. 5a and 5b all contain pixels, and each region of pixels reads on a "neighborhood". The motivation for using this method is that it "eliminates the largest possible number of interfaces to merge adjacent regions whose intensities are practically identical" (col. 1, lines 37-45). It would have been obvious to one skilled in the art to modify Catros to include a scale parameter to merge similar adjacent regions to aid in correctly identifying contours.

Claim 20 further recites "selecting an optimal scale parameter from said plurality of scale parameters by determining a scale parameter from said plurality of scale parameters that minimizes variance between regions defined by its respective contours". The disclosure by Makram-Ebeid above describes incrementing of a scale parameter until an optimum level is reached. It also describes an Energy function that includes a variance term, which is minimized based on the scale parameter.

12. Claim 21 recites "The method of claim 20 wherein said method further comprising: encoding a boundary object utilizing said two vertices and said optimal scale parameter". Catros discloses bridging "between each of the facing ends of the disjointed contour elements" (col. 1, lines 40-54). This bridging forms a new contour between two points, which reads on "encoding a boundary object utilizing two vertices", as recited by claim 21. Catros does not disclose an optimal scale parameter. Makram-Ebeid discloses an optimal scale parameter, as described in the rejection of claim 20. It

would have been obvious to modify Catros to utilize an optimal scale parameter to encode a boundary object in order to merge similar adjacent regions to aid in correctly identifying contours.

13. Claim 22 recites "The method of claim 20 wherein said detecting further comprising: incrementally detecting a contour of said plurality of contours by utilizing a threshold value, wherein said shortest path is determined by a graph searching process that limits searching of paths to distances less than said threshold value". Catros discloses "if the coding cost of the shortest path is less than a given threshold, this path is considered as the corresponding to the desired bridging, if not, there is no bridging possible between the two points" (col, 2, lines 59-63). The bridging disclosed by Catros reads on the contour detection recited in claim 22.

14. Claim 23 recites "The method of claim 20 wherein said detecting a plurality of contours is operable to only select contours within a rectangular area defined by a width parameter and said two vertices". Catros discloses "The search space in the image memory is defined in the way shown in FIG. 1, where there is inserted between two points A and B, marking the ends of a discontinuity in a contour C of the image, a square of side D equal to the distance separating the two points A and B and oriented in the plane so that points A and B are disposed on two opposite sides of the square in the middle thereof" (col. 2, lines 63-68; col. 3, lines 1-2). Also see Figure 1 of Catros for further disclosure of this square. Since a square is a type of rectangle, this square reads on the rectangle in claim 23. The "width parameter" in this disclosure is set to the length of side D.

15. As to claim 31, Catros in view of Makram-Ebeid discloses the method of claim 20. Catros further discloses a method wherein detected contours approximate respective edges of the boundary information (col. 1, lines 22-29; the invention approximates edges in areas it is not clear where the edges are).

16. As to claim 32, Catros in view of Makram-Ebeid discloses the method of claim 31. Catros further discloses a method wherein the edges of the boundary information exist before detecting (col. 2, lines 42-48; the invention uses existing data about gradients to detect contours).

17. Claim 24 is rejected under 35 U.S.C. 103(a) as being unpatentable over Catros in view of Makram-Ebeid as applied to claims 20-23 above, and further in view of Luo ("Designing an Interactive Tool...").

Claim 24 recites "The method of claim 23 wherein said width parameter and said two vertices are selected by a user interface". Catros in view of Makram-Ebeid renders obvious the method of claim 23 above. Neither Catros nor Makram-Ebeid disclose a user interface for selecting width parameters and two vertices. Luo discloses "In practice, both the width and height of the global search stripe can be determined by the user in an interactive way, according to the motion of video object" (page 8, lines 1-8). See Figure 4 of Luo for an example of how the width and height can be limited. Luo further discloses "In our system, the user defines a video object by specifying its contour on multiple anchor frames" (page 2, lines 3-19).

The height of the local search stripe disclosed by Luo reads on the width parameter of claim 24. The contour specified by the user in Luo reads on the two

vertices of claim 24, because a number of vertices define a contour. Luo discloses that "fully automatic segmentation is difficult" (page 1, lines 27-29), giving the motivation for including a user interface. It would have been obvious to one skilled in the art to modify Catros and Makram-Ebeid to include a user interface in order to simplify the task of segmentation as taught by Luo.

Conclusion

18. Claims 12-14, 16-19, 29, 30, 35, and 36 are allowed.

19. Claims 33 and 34 would be allowable if rewritten or amended to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Aaron M. Richer whose telephone number is (571) 272-7790. The examiner can normally be reached on weekdays from 8:30AM-5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kee Tung can be reached on (571) 272-7794. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

AMR
11/26/07

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SUPERVISORY PATENT EXAMINER